In the Claims:

Cancel claims 1-30.

Add new claims 31-44 as follows:

31. A reconfigurable optical routing device comprising an integrated multiphase spatial light modulator for spatial phase modulation of unpolarized light of a predetermined wavelength, the integrated spatial light modulator having a substantially planar liquid crystal layer, a layer reflective of said light of said wavelength and a wave-plate layer, the wave-plate layer providing an optical retardance of $(2n+1)\lambda/4$, said liquid crystal layer having two opposed faces and being disposed and configured to provide an out of plane tilt in response to a voltage applied between said faces, and said liquid crystal layer being spaced from the reflective layer by the said wave-plate layer, wherein the integrated spatial light modulator comprises an integrated array of phase modulating elements and voltage application circuitry, the voltage application circuitry for applying desired voltages across the liquid crystal layer whereby the liquid crystal layer has desired values of out of plane tilt; wherein the integrated multiphase spatial light modulator comprises an array of electrodes, each of the electrodes being associated with a respective portion of the liquid crystal layer to define a said phase modulating element, the electrodes being such that application of voltage to each electrode causes the portion of the liquid crystal layer associated with the said electrode to have a specific value of said out-of-plane tilt; and:
wherein the voltage application circuitry is adapted to apply voltages to said array of electrodes for varying a deflection angle of light incident upon said array of phase modulating elements.

32. The reconfigurable optical routing device of Claim 31, wherein said liquid crystal layer is a nematic liquid crystal layer.

33. The reconfigurable optical routing device of Claim 31, wherein said liquid crystal layer is a pi-cell.

34. A reconfigurable optical routing device comprising a first and a second integrated multiphase spatial light modulator for spatial phase modulation of unpolarized light of a predetermined wavelength, the integrated spatial light modulators having a substantially planar liquid crystal layer, a layer reflective of said light of said wavelength and a wave-plate layer, the wave-plate layer providing an

optical retardance of $(2n+1)\lambda/4$, said liquid crystal layer having two opposed faces and being disposed and configured to provide an out of plane tilt in response to a voltage applied between said faces, and said liquid crystal layer being spaced from the reflective layer by the said wave-plate layer, wherein the integrated spatial light modulators comprise an integrated array of phase modulating elements and voltage application circuitry, the voltage application circuitry for applying desired voltages across the liquid crystal layer whereby the liquid crystal layer has desired values of out of plane tilt; wherein the integrated multiphase spatial light modulators comprise an array of electrodes, each of the electrodes being associated with a respective portion of the liquid crystal layer to define a said phase modulating element, the electrodes being such that application of voltage to each electrode causes the portion of the liquid crystal layer associated with the said electrode to have a specific value of said out-of-plane tilt; and:
wherein the voltage application circuitry is adapted to apply voltages to said array of electrodes for varying a deflection angle of light and the second integrated spatial light modulator is disposed with respect to the first integrated spatial light modulator for receiving light from said first integrated spatial light modulator thereby to route said light.

Contd. Cl 7

35. The reconfigurable optical routing device of Claim 34, having a first array of optical fibers forming light sources directed to be off-normally incident on the first integrated spatial light modulator and a second array of optical fibers forming light receivers directed to be off-normally incident on the second integrated spatial light modulator for receiving light from the second integrated spatial light modulator.

36. The reconfigurable optical routing device of Claim 34, wherein said liquid crystal layer is a nematic liquid crystal layer.

37. The reconfigurable optical routing device of Claim 34, wherein said liquid crystal layer is a pi-cell.

38. The reconfigurable optical routing device of Claim 34, in which a half wave plate is disposed between said first and second spatial light modulators.

39. A routing switch comprising a first and a second integrated multiphase spatial light modulator for spatial phase modulation of unpolarized light of a predetermined wavelength, the integrated spatial light modulators having a substantially planar

liquid crystal layer, a layer reflective of said light of said wavelength and a wave-plate layer, the wave-plate layer providing an optical retardance of $(2n+1)\lambda/4$, said liquid crystal layer having two opposed faces and being disposed and configured to provide an out of plane tilt in response to a voltage applied between said faces, and said liquid crystal layer being spaced from the reflective layer by the said wave-plate layer, wherein the integrated spatial light modulators comprise an integrated array of phase modulating elements and voltage application circuitry, the voltage application circuitry for applying desired voltages across the liquid crystal layer whereby the liquid crystal layer has desired values of out of plane tilt; wherein the integrated multiphase spatial light modulators comprise an array of electrodes, each of the electrodes being associated with a respective portion of the liquid crystal layer to define a said phase modulating element, the electrodes being such that application of voltage to each electrode causes the portion of the liquid crystal layer associated with the said electrode to have a specific value of said out-of-plane tilt; and: wherein the voltage application circuitry is adapted to apply voltages to said array of electrodes for varying a deflection angle of light and the second integrated spatial light modulator is disposed with respect to the first integrated spatial light modulator for receiving light from said first integrated spatial light modulator thereby to route said light,

the device further comprising:

a first array of optical fibers forming light sources directed to be off-normally incident on the first integrated spatial light modulator and a second array of optical fibers forming light receivers directed to be off-normally incident on the second integrated spatial light modulator for receiving light from the second integrated spatial light modulator; and

drive circuitry for forming a respective plurality of switching holograms on each integrated spatial light modulator, each said switching hologram on said first integrated spatial light modulator in use being operative to deflect light incident on said first integrated spatial light modulator to said switching holograms on said second integrated spatial light modulator, and each said switching hologram on said second integrated spatial light modulator in use being operative to deflect said light beams to a respective optical receiver.

40. The routing switch of Claim 39, wherein the switching holograms are spaced apart on said first and second integrated spatial light modulators and the first and second integrated spatial light modulators are disposed such that a respective zero-order beam reflected from each switching hologram on said first integrated spatial

light modulator is incident on a spacing between two adjacent switching holograms on said second integrated spatial light modulator.

41. The routing switch of Claim 39, wherein a half wave plate is disposed between said first and second integrated spatial light modulators.

42. The routing switch of Claim 39, wherein the first and second spatial light modulators are mutually offset so no zero-order beams from the first spatial light modulator are incident on the second spatial light modulator.

Cont'd. A1

43. The routing switch of Claim 39, wherein the switching holograms are spaced apart on said first and second spatial light modulators, and the first and second spatial light modulators are disposed such that a respective second-order beam from each switching hologram on said first spatial light modulator is incident on a space between two adjacent switching holograms on said second spatial light modulator.

44. A method of routing a light beam incident on an array of phase modulating elements, the light beam having a first component polarized in a first direction and a second component polarized in a second direction orthogonal to the first, the method comprising:
providing an integrated spatial light modulator comprising a liquid crystal layer, a wave plate layer having an optical retardance of $(2n+1)\lambda/4$ and a reflector layer, the liquid crystal being responsive to a variation in a drive voltage to provide a variation in out-of-plane director angle tilt, the spatial light modulator having an array of electrodes wherein each electrode is associated with a respective portion of the liquid crystal layer to define a said phase modulating element whereby the spatial light modulator comprises a said array of phase modulating elements;
applying respective drive voltages to each said electrode whereby the portion of liquid crystal associated with the electrode has a respective specific value of director angle tilt;
applying said beam to the integrated spatial light modulator whereby the first and second components each pass through the liquid crystal layer and the wave plate layer, and are reflected at the reflector layer to again pass through the wave plate layer and liquid crystal layer to emerge with both components phase modulated by the same amount; and
controlling the drive voltages to vary a deflection direction of said light beam due to said array of phase modulating elements.

Favorable action is respectfully requested.

Respectfully submitted,
William Crossland et al.

by ______________________
Allston L. Jones
Reg. No. 27,906

Peters, Verny, Jones & Schmitt, L.L.P.
385 Sherman Ave., Suite 6
Palo Alto, CA 94306
Voice: 650/324-1677 ext. 22
FAX: 650/324-1678
e-mail: alj888@aol.com
April 3, 2002